

# MONTHLY WEATHER REVIEW.

Editor: Prof. CLEVELAND ABBE. Assistant Editor: FRANK OWEN STETSON.

VOL. XXXIII.

OCTOBER, 1905.

No. 10

## INTRODUCTION.

The MONTHLY WEATHER REVIEW for October, 1905, is based on data from about 3495 stations, classified as follows:

Weather Bureau stations, regular, telegraph, and mail, 176; West Indian Service, cable and mail, 13; River and Flood Service, regular 52, special river and rainfall, 363, special rainfall only, 98; cooperative observers, domestic and foreign, 2565; total Weather Bureau Service, 3267; Canadian Meteorological Service, by telegraph and mail, 33; Meteorological Service of the Azores, by cable, 2; Meteorological Office, London, by cable, 8; Mexican Telegraph Company, by cable, 3; Army Post Hospital reports, 18; United States Life-Saving Service, 9; Jamaica Weather Service, 130; Costa Rican Meteorological Service, 25. Total, 3495.

Since December, 1904, the Weather Bureau has received an average of about 1700 reports from as many observers and vessels, giving international simultaneous observations over the Atlantic and Pacific oceans at 12 noon, Greenwich time, or 7 a. m., seventy-fifth meridian time. These are charted, and, with the corresponding land observations, will form the framework for daily weather charts of the globe.

Special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Capt. S. I. Kimball, General Superintendent of the United States Life-Saving Service; Capt. H. M. Hodges, U. S. N. (Retired), Hydrographer, United States Navy; Anastasio Aljaro, Director of the Physico-Geographic Institute, San José, Costa Rica; Commandant Francisco S. Chaves, Director of the Meteorological Service of the Azores, Ponta Delgada, St. Michaels, Azores; W. N. Shaw, Esq., Sec-

retary, Meteorological Office, London; H. H. Cousins, Chemist, in charge of the Jamaica Weather Office; Señor Enrique A. Del Monte, Director of the the Meteorological Service of the Republic of Cuba; Rev. L. Gangoiiti, Director of the Meteorological Observatory of Belen College, Havana, Cuba.

Attention is called to the fact that at regular Weather Bureau stations all data intended for the Central Office at Washington are recorded on seventy-fifth meridian or eastern standard time, except that hourly records of wind velocity and direction, temperature, and sunshine are entered on the respective local standards of time. As far as practicable, only the seventy-fifth meridian standard of time, which is exactly five hours behind Greenwich time, is used in the text of the REVIEW. The standards used by the public in the United States and Canada and by the cooperative observers are believed to conform generally to the modern international system of standard meridians, one hour apart, beginning with Greenwich. The Hawaiian standard meridian is  $157^{\circ} 30'$ , or  $10^{\text{h}} 30^{\text{m}}$  west of Greenwich. The Costa Rican standard meridian is that of San José,  $5^{\text{h}} 36^{\text{m}}$  west of Greenwich.

Barometric pressures, whether "station pressures" or "sea-level pressures", are now reduced to standard gravity, so that they express pressure in a standard system of absolute measures.

In conformity with Instructions No. 43, March 29, 1905, the designation "voluntary", as applied to the class of observers performing services under the direction of the Weather Bureau without a stated compensation in money, is discontinued, and the designation "cooperative", will be used instead in all official publications and correspondence.

Hereafter the titles of the respective forecast districts will be as used in the current REVIEW to accord with paragraph 236 of Station Regulations, dated June 15, 1905.

## FORECASTS AND WARNINGS.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

The month opened with high northwest winds on the North Sea, and during the 4th and 5th west to north gales prevailed on the British coasts. Barometric pressure was high over the British Isles from the 7th to 14th and 17th to 25th, and low on the 15th and 16th and from the 26th to 29th. In the vicinity of the Azores pressure was low during the first decade of the month and rising or high from the 10th to 15th, 18th to 20th, and 23d to 31st. On the 9th the barometer fell to 29.70 at Horta, Fayal, and the wind reached a velocity of 46 miles an hour from the south. During the 21st and 22d a barometric disturbance moved eastward over the Azores, with pressure falling to 29.66 on the 22d. Passing eastward the Azores storm reached Portugal and Spain, with lowest reported barometer reading, 29.42, at Lisbon on the 24th, and the barometer rose at that place to 29.50 on the morning of the 25th and to 29.88 by the morning of the 26th.

The only West Indian disturbance of marked intensity appeared over the Caribbean Sea south of San Domingo on the 3d and 4th, recurved north near the Windward Passage on the 5th, and passed in a northerly course to the westward of

Turks Island on the 6th. From the eastern Bahamas this disturbance moved northeastward and passed to the south and east of Bermuda during the afternoon of the 8th. A fresh east to northeast gale prevailed during the day and night of the 8th at Bermuda, and the barometer at Hamilton at 8 p. m. was 29.66 inches. To the east and southeast of Bermuda gales of hurricane force were reported. From the vicinity of Bermuda the center of the storm moved northeastward to the Banks of Newfoundland. The action of the storm was not severe until after recurving northeastward from the Bahamas, when the barometric pressure began to decline rapidly, with a corresponding increase in wind force. In about latitude  $45^{\circ}$  north and longitude  $45^{\circ}$  west the steamship *La Savoie*, at 4 p. m. of the 11th, reported a barometric reading of 27.92 inches; and a disastrous storm-wave, within its area, was encountered on the same day by the steamship *Campania*. Advices to West Indian, Gulf, and Atlantic coast interests regarding the storm were begun October 3 and continued daily until it recurved northeastward over the Atlantic. On the 6th advices to Bermuda and Halifax regarding its movement were begun and

were continued until it passed Bermuda, and on the morning of the 9th Lloyds, London, was advised by cable that a tropical disturbance was moving northeastward from Bermuda.

In the United States twelve of the thirteen areas of low pressure of the month belong to two well-defined types. The greater number developed or first appeared over the southern Rocky Mountain and Plateau regions; five advanced from the extreme Northwest, and one from the Gulf of Mexico. The high areas also followed uniform tracks and advanced from the Northwest to the central valleys and thence eastward to the Atlantic coast districts.

The first important storm of the month moved from the Gulf of Mexico northeastward to the Canadian Maritime Provinces from the 9th to 12th attended throughout by heavy rain and high winds. On the 11th this disturbance was joined, over eastern New York, by an area of low pressure that appeared over the north Pacific coast district on the 7th, advanced in a general easterly direction to Ontario, and moved thence south-eastward. From the 13th to the 16th, a disturbance moved from the middle Rocky Mountain region northeastward over Lake Superior and thence eastward toward the Gulf of St. Lawrence attended on the 15th by gales on the Great Lakes. Great damage to shipping was caused, especially on Lake Erie, by a storm, low area IX, that advanced from the middle Plateau over the lower Missouri Valley and thence northeastward from the 18th to 21st. Speaking of the action of the Weather Bureau in connection with this storm the Buffalo Courier says:

The accuracy of the forecasts regarding the terrific gale which recently swept the Lake region is well worthy of being noted. Wednesday morning warnings were issued that Lake vessels ought not to leave port unless they could reach their destinations before Thursday afternoon. Thursday morning storm signals were displayed and another special warning given. The storm, which at Buffalo attained a velocity of 78 miles on hour Friday morning, was precisely as predicted, and information of its coming had been given at all important points on its route. Vessels were wrecked and lives destroyed by the commotion of wind and wave. Probably they were beyond reach of the warnings, or neglected them. It is fully as probable that many vessels stayed safely in harbor because the Weather Bureau forecasts were heeded.

Under the combined influence of low area XI and high area X strong northeast winds prevailed off the Virginia and Carolina coasts on the 26th. A maximum velocity of 52 miles an hour was reported at Cape Henry, Va. On account of the wind and high sea many vessels sheltered in Hampton Roads.

Low barometric pressure over Arizona and New Mexico and the northeastward movement from the Gulf of Mexico of a barometric depression was followed by a sweep of high pressure from the Northwest that carried frost bearing temperatures to northern Arkansas by the 11th, and to the interior of the middle and east Gulf and South Atlantic States by the mornings of the 12th and 13th. Light frost occurred at Pensacola on the 12th and at Mobile on the 13th. High area VII following the passage of low area IX caused frost in the middle and northern portions of the Gulf States. Attending high area VIII light and heavy frost occurred on the 22d and 23d in the middle and east Gulf and South Atlantic States.

The first snow of the season was noted in the Lake region and Ohio Valley on the 11th, and in western Pennsylvania and interior of New York on the 12th. On the 28th snow fell in eastern Kansas, western Missouri, and the Northwest.

The Chief of Bureau is pleased to acknowledge the receipt of a communication from the Jacksonville Board of Trade, Jacksonville, Fla., appreciative of the great service of the U. S. Weather Bureau to the various industries of that State.

#### BOSTON FORECAST DISTRICT.

The weather was exceptionally pleasant, with an unusual prevalence of sunshine, an equable distribution of moderate temperatures, and a marked deficiency in precipitation. Snow fell in many northern sections, but only traces, with the excep-

tion of one inch at Enosburg Falls, Vt. The few storms of the month were of light to moderate intensity, and no destructive winds were experienced along the coast. Storm warnings were issued on the 11th, 20th, and 26th. Frost warnings were issued to the cranberry growers on the 12th, and were verified by moderate to killing frosts. The first killing frost at Boston occurred on the 26th, with minimum temperature at freezing.—*J. W. Smith, District Forecaster.*

#### NEW ORLEANS FORECAST DISTRICT.

Storm warnings were issued for the central Gulf coast on the 8th and 9th and were fully justified. Frost warnings were issued for portions of the district on the 10th, 11th, 15th, 19th, and 20th, and frost occurred over a great portion of the areas named in the forecasts, except on the 16th. No frosts occurred without timely warnings having been issued. The following press comments show how the work of the Weather Bureau is appreciated. The New Orleans Item, in speaking of the storm of the 8-9th, says:

The Weather Bureau sent out storm warnings Sunday morning in advance of the high winds, advising shipping and public interests fully regarding anticipated conditions.

In connection with the frost warnings issued by the Weather Bureau, the Daily Picayune of October 13 says:

Frost warnings issued by the Weather Bureau have proven of incalculable benefit to the sugar and trucking interests along the Gulf coast, and in periods of epidemics of yellow fever the warnings are additionally interesting because the first appearance of frost, which kills the progress of the fever, heralds the resumption of interstate and inter-urban business by the withdrawal of quarantines. Special bulletins predicting frosts in northern Louisiana were issued Wednesday and were fully verified yesterday morning.

*I. M. Cline, District Forecaster.*

#### CHICAGO FORECAST DISTRICT.

Easterly warnings were ordered on the 14th and changed to northwest on the 15th, as a storm approached the Lake region from the Middle West. This storm was accompanied by general high winds, especially after the winds shifted to the west, and some wrecks were reported; but it is thought that the losses were not greater on account of the ample warning that all interests received. The most severe storm of the month appeared in the Plateau region on the 18th, and by the morning of the 19th it had crossed the Rockies and reached the Missouri Valley. It developed rapidly during the 19th and by the morning of the 20th had crossed the upper Lake region and reached Ontario. During its passage general gales prevailed on all the Lakes, the wind reaching maximum velocities not previously attained this year. Although general warnings were issued in advance of the storm, wrecks reported were numerous, many smaller craft being wiped out of existence. On all lakes 34 vessels were reported lost, but they were chiefly of a kind that is not being built at the present time. Northwest warnings were again ordered on the 31st at all stations for another disturbance which passed over the upper Lakes accompanied by general high winds, maximum velocities being reported from nearly all stations. No wrecks occurred as far as known. Frost warnings were issued as follows: On the 10th for the entire district, except Michigan and Indiana, to which States they were extended on the 11th. Frost was again predicted on the 20th and, while all these warnings were fully verified, it is not known whether any benefits were derived.—*H. J. Cox, Professor and District Forecaster.*

#### DENVER FORECAST DISTRICT.

An excess of precipitation was noted in Wyoming and north-central Colorado and, except along the southern border of the district, the month was colder than usual. The early part of the month was warm, but after the 8th temperatures were almost continually below the seasonal average. Strictly speaking, there were no cold waves, and the only special warnings issued were for frosts.—*F. H. Brandenburg, District Forecaster.*

## SAN FRANCISCO FORECAST DISTRICT.

The month was one of nearly normal conditions, except that there was less rain than usual. The unexpected development of a high area on the north Pacific coast on the 7th caused clear, cold weather in California and Nevada, with heavy frosts in mountain sections. This high practically controlled conditions until the middle of the month. Another high area controlled the weather from the 18th to the 22d.—*A. G. McAdie, Professor and District Forecaster.*

## PORTLAND FORECAST DISTRICT.

A stormy period set in on the 1st which culminated on the 6th in one of the worst gales ever known so early in the season. The North Head and Tatoosh Island stations reported maximum wind velocities of 72 miles from the southeast and east, respectively, on that date; at Seattle the maximum velocity was 48 miles from the south and at Tacoma it was 40 miles from the southwest. Warnings for this series of storms were issued well in advance of their occurrence and the casualties that occurred were of minor importance. Other gales occurred on the 17th and the 24th for which warnings were issued. No storms occurred without warnings.

On the 10th, killing frosts occurred in the sections of the

districts east of the Cascade Mountains, and on the 18th, killing frosts were reported generally in the western sections. The frost warnings issued in the sections of the district east of the Cascade Mountains were timely, but those issued for localities west of the Cascade Mountains were only partially verified.—*E. A. Beals, District Forecaster.*

## RIVERS AND FLOODS.

The work of the River and Flood Service was practically featureless during the month. In nearly all the rivers the stages of water were lower than during the month immediately preceding, although not quite so low as is usual during the month of October. There was, however, sufficient water for steamboat traffic in the navigable rivers, except the Tennessee.

The highest and lowest water, mean stage, and monthly range at 270 river stations are given in Table VI. Hydrographs for typical points on seven principal rivers are shown on Chart V. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—*H. C. Frankenfield, Professor of Meteorology.*

## CLIMATE AND CROP SERVICE.

By Mr. JAMES BERRY, Chief of Climate and Crop Division.

The following summaries relating to the general weather and crop conditions during October are furnished by the directors of the respective sections of the Climate and Crop Service of the Weather Bureau; they are based upon reports from cooperative observers and crop correspondents, of whom there are about 3300 and 14,000, respectively:

**Alabama.**—The weather was wet and unfavorable for maturing and gathering cotton and corn, though fairly favorable for late minor crops. Some cool nights, with heavy to killing frosts, but latter too late for material damage. Rain damaged much open cotton and retarded picking, though about nine-tenths of the crop was gathered by the close of the month, with generally light yield. Corn yielded well, but the quality was inferior and the crop was not all housed. Minor crops were satisfactory. Little fall plowing or seeding was done.—*F. P. Chaffee.*

**Arizona.**—Rainfall greatly deficient. Temperature evenly distributed. Frost injured fruit and vegetables slightly. Plowing extensive toward the latter part of the month; very little grain sown. Cutting of corn completed over the south, much unmaturing over the central section. Fall and winter gardens yielding splendidly, the sixth crop of alfalfa gathered and seventh blooming, over southern counties. Oranges ripe at end of month; yield most promising. Olive picking continued. Winter Nellis pears ripening. Range grass scarce over the southwestern section. Water for stock diminishing; irrigation water plentiful. All stock doing well.—*L. N. Jesunofsky.*

**Arkansas.**—General and heavy rains on the 18th, 19th, 24th, and 25th injured cotton to a considerable extent and retarded picking. About two-thirds of the cotton crop was secured by the close of the month, with a poor to fair yield. Corn was all housed, with generally poor yield. Sweet and late Irish potatoes were being gathered, with fair to good yields. Fall plowing made good progress during the month. Much wheat was sown and the early planted came up to a good stand.—*C. M. Strong.*

**California.**—Abnormally dry, clear weather prevailed most of the month, with occasional heavy fogs in the coast districts, northerly winds, and light rains. Frosts in the interior caused no damage. Conditions were very favorable for citrus fruits and for completing the season's work in fruit drying, raisin making, hay baling, and harvesting beans and corn. The orange crop was in first class condition, and the first car load was shipped east from Tulare County on the 28th.—*Alexander G. McAdie.*

**Colorado.**—During the closing days farming operations on the eastern slope were seriously interrupted by heavy snow and freezing weather, delaying potato digging and beet pulling, one-half of these crops being still unharvested; otherwise conditions were generally favorable to ripening and harvesting outstanding crops. In the north-central division the area plowed and seeded was smaller than usual. Except in a few localities, where the moisture was insufficient, fall wheat and rye germinated nicely.—*Frederick H. Brandenburg.*

**Florida.**—The temperature averaged about normal. The deficiency in precipitation exceeded an inch. The cotton crop was practically housed,

averaging about two-thirds of a crop. The month was excellent for harvesting, but unfavorable for seeding, germination, and growth of vegetables. The dry weather was particularly unfavorable over the greater part of the central district, where work was suspended. Citrus fruits colored rapidly and improved in quality; shipments increased. The crop promised to be less than that of the previous year.—*A. J. Mitchell.*

**Georgia.**—Conditions were about normal. Temperatures were low on the 21st–24th, killing frost general over the north, light to heavy in other sections. The rainfall was well distributed. Cotton picking was about completed; the crop was below average, but better in some districts than had been expected; bulk of crop marketed. Corn harvesting completed in some sections; yield fair to good. Potatoes good crop. Turnips poor; other minor crops about an average. Fall plowing and seeding was progressing rapidly at the close of the month; acreage of wheat to be increased.—*J. B. Marbury.*

**Hawaii.**—See corrigenda.

**Idaho.**—Harvest of sugar beets and late fruits progressed throughout the month. In elevated districts some fruit was frozen on the trees. Range stock generally found ample subsistence, but in some localities feed was short. In northern wheat growing districts moisture was sufficient for soil preparation, but elsewhere the ground was very dry most of the month.—*Edward L. Wells.*

**Illinois.**—The first killing frost of autumn occurred on the morning of the 12th. Corn was fully matured and no damage ensued. Farming operations were interrupted by rains, excessive in the southern district, but good progress was made in plowing and in husking and cribbing corn. Corn was yielding well in the northern and southern districts, but was below expectations in the central. The outlook for wheat was uniformly favorable. Apples were scarce and of inferior quality. The potato output was below average.—*Wm. G. Burns.*

**Indiana.**—In the south portion of the State frequent rains retarded wheat sowing; in the north portion, where conditions were more favorable, fall seeding was completed. Killing frosts on the 11th, 12th, and 21st shortened the tomato crop, but did no other damage. The corn crop was heavy; it dried slowly and in places was down and rotting. The potato crop was light. Tobacco was safely housed. Apples were scarce; pears were plentiful. Pastures were fairly good.—*W. T. Blythe.*

**Iowa.**—The first decade was very favorable for ripening latest planted corn, and the crop was wholly safe before killing frost on the 11th. About the middle of the month heavy rains caused some damage to corn that had been flattened by wind. The last decade brought good weather for cribbing and fair progress was made. Increased acreage of wheat made good stand. All minor crops were well secured and pastures were excellent at close of the month.—*John R. Sage.*

**Kansas.**—Wheat was in good condition, but needed rain in the central and western portions of the State. It was generally making slow growth. Corn husking was progressing satisfactorily and the crop was generally good, but it was too wet in the eastern counties, where much corn was rotting. Apple picking and potato digging were in progress, with fair crops. The fifth crop of alfalfa was stacked. Cattle and pastures were doing well.—*S. D. Flora.*

**Kentucky.**—Periods of rain were the 1st–3d, 10–11th, 15–20th, 24–26th,